Dec. 12, 1950 J. A. YERKES 2,534,094

PAPER PUNCH

Filed March 9, 1946 3 Sheets-Sheet 1

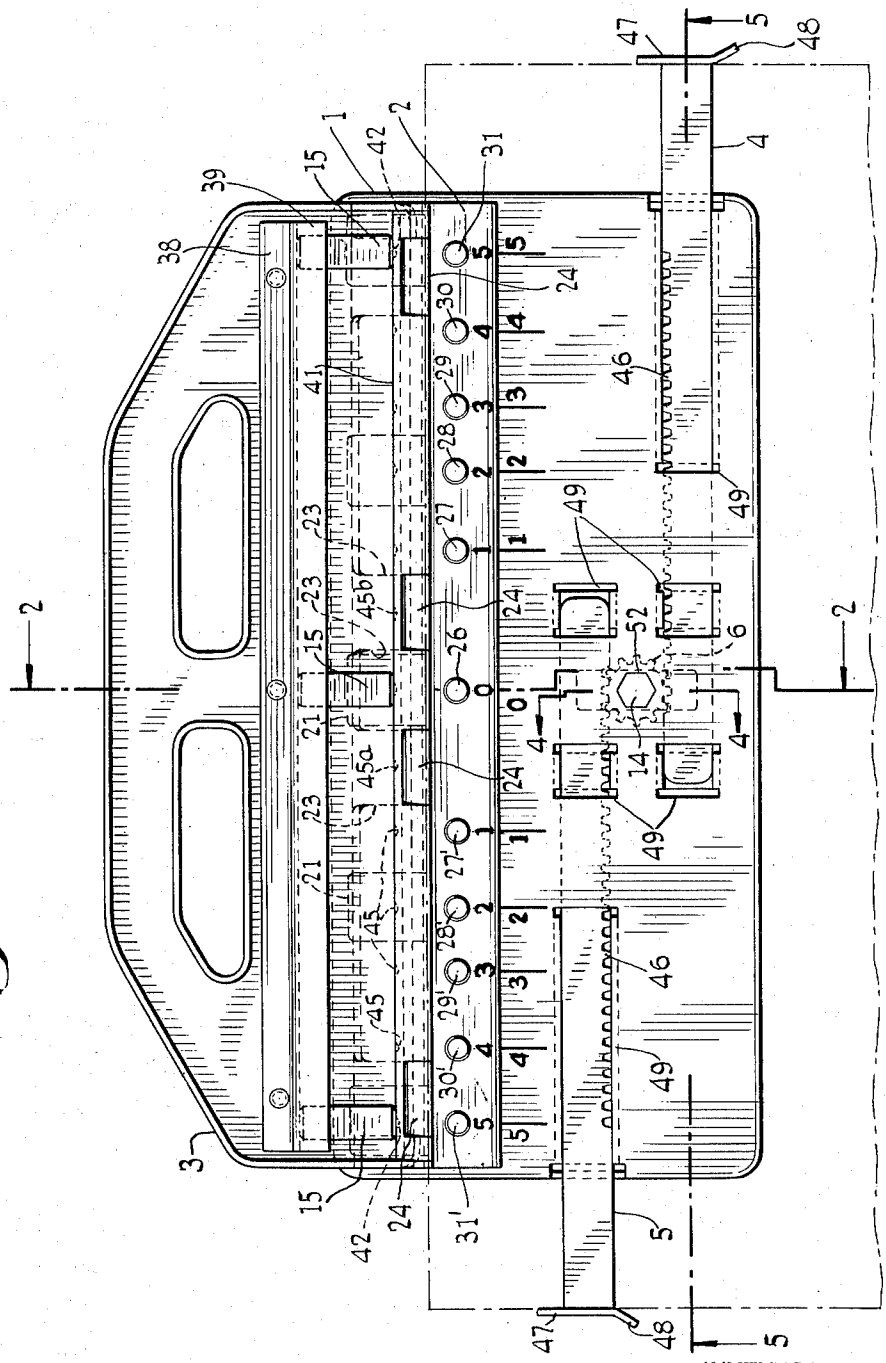


Fig. 1.

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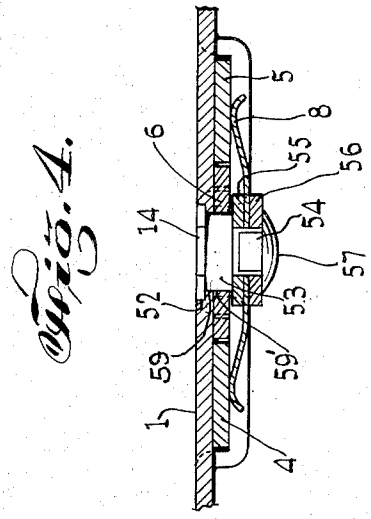


Fig. 4.

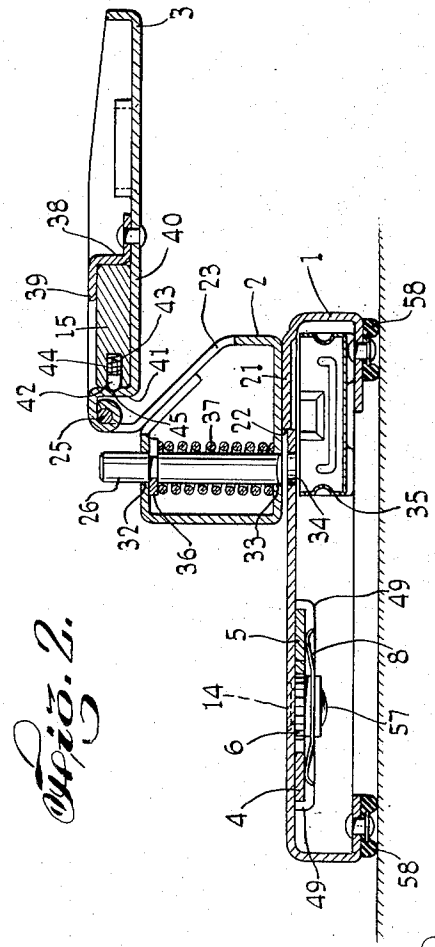


Fig. 2.

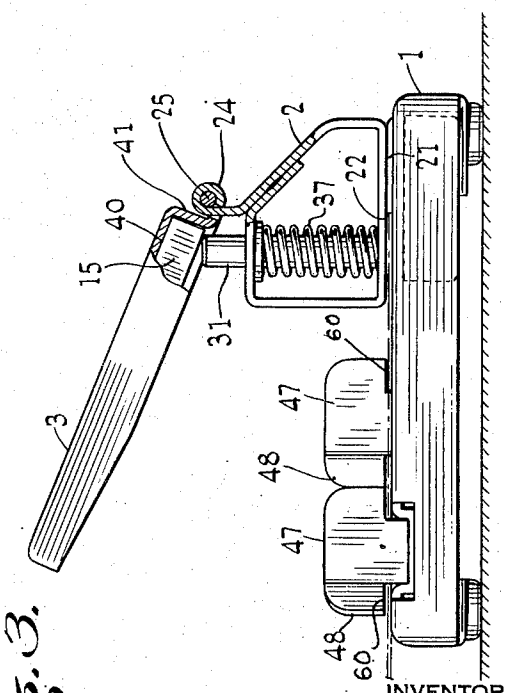


Fig. 3.

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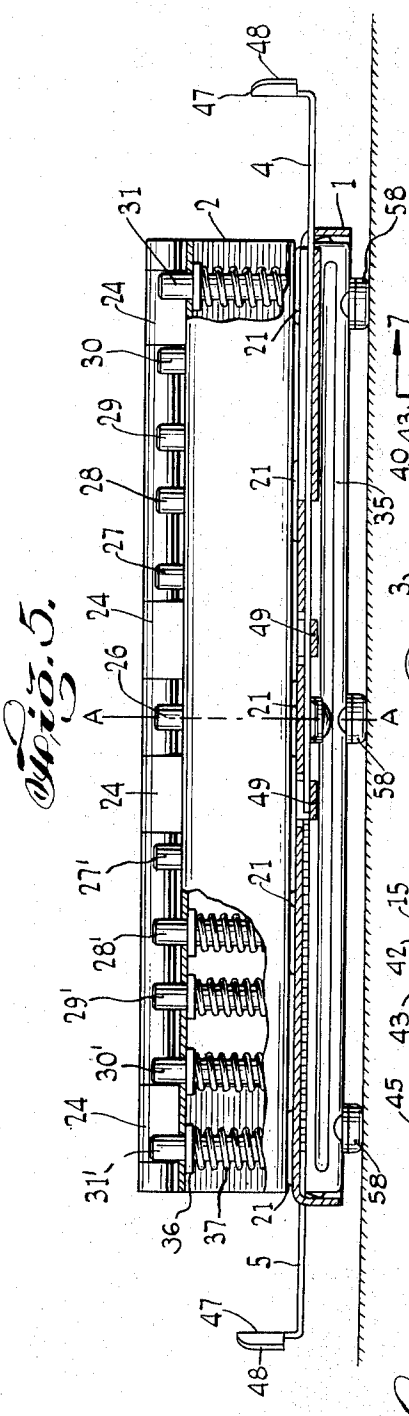


Fig. 5.

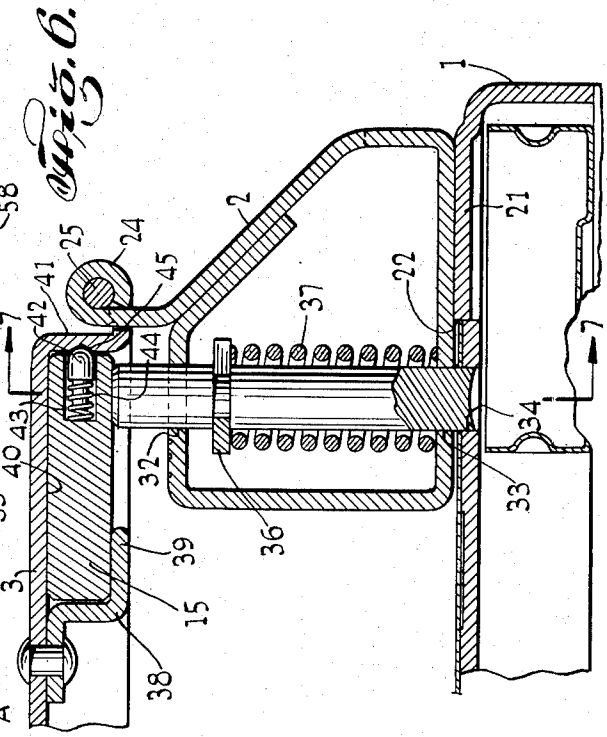


Fig. 6.

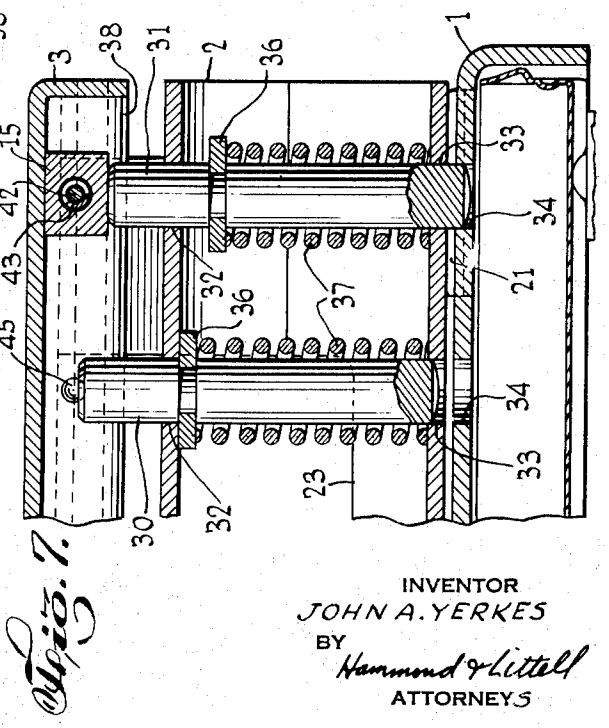


Fig. 7.

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UNITED STATES PATENT OFFICE

2,534,094

PAPER PUNCH

John A. Yerkes, New York, N. Y.

Application March 9, 1946, Serial No. 653,343

21 Claims. (Cl. 164—91)

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This invention relates to a perforating device and especially to an apparatus for punching a plurality of holes in sheets of paper, cardboard, or similar material.

In filing papers and the like, it usually is necessary to punch a plurality of holes therein for the purpose of allowing insertion of paper fasteners, for insertion of the papers in books, and for other related uses. When papers are to be fastened, it is desirable to center accurately the holes to be punched and to be able to set the paper punch readily and with precision in accordance with the particular file or folder involved. This invention includes improvements on the device shown in copending application, Serial No. 633,636, filed December 8, 1945, now Patent No. 2,524,532, issued October 3, 1950, although some parts thereof may be used separately therefrom.

In order to produce various arrangements or patterns of holes, it is required that the punches be selectively operable and arranged so that they can be chosen correctly and with ease. In cooperating with the selectively operable punches, an automatically centering guide means can be provided for holding the paper or stack of papers centrally, regardless of paper width, to insure accuracy in the punching operation and to facilitate selection of the desired pattern of holes to be punched.

One of the objects of the present invention is to provide a universal apparatus and method for spacing holes to be punched or perforated wherein the paper is positioned centrally, regardless of width, and punches selected relative to the central point or punch to give the desired pattern. Pairs of holes equidistant from the center can be punched and, if desired, a central hole in addition to the equidistant pairs of holes. Also various non-standard arrangements can be punched as will be described hereinafter.

Another object of the invention is to provide easily operable selector bars which are shiftable to selectively engage the desired punches so that the various combinations can be operated in accordance with the setting thereof, the bars being carried by an operating handle and slidable therein. When a bar is opposite a punch, operation of the handle will cause depression of the punch thereby. When a bar is not opposite a punch, the shank of the punch will pass upwardly within the handle.

Another object of the invention is to provide a means for releasably locking the selectors in place when they are set, the locking means serving to properly center the selector opposite a punch.

Another object of the invention is to provide a pair of gauge bars adjustable transversely on the base to cooperate with the various selectably operable punches to provide the desired combination or pattern of holes. The gauge means is described in detail in said copending application, Serial No. 633,636.

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Another object of the invention is to provide an assembly which can have parts made by stamping and the base formed with indentations or bosses which can be used for bearing surfaces for the various components. The punch described herein can be economically and easily manufactured and will be strong structurally.

Other objects of the invention will become apparent from the following description and drawings which are merely exemplary.

In the drawings:

Fig. 1 is a plan view of a punch with the handle in open position and the selectors set for operating three of the punches.

Fig. 2 is a sectional view taken generally along the line 2—2 of Fig. 1.

Fig. 3 is a side elevation with part of the handle and bracket broken away, the handle being in position just before a punch is depressed.

Fig. 4 is a fragmentary sectional view taken along the line 4—4 of Fig. 1 showing details of the gauge pivot.

Fig. 5 is a front view of Fig. 1, with part of the bracket broken to show the punches and the front of the base broken to show the gauges and tray.

Fig. 6 is an enlarged fragmentary sectional view through one of the punches after it has been operated by the handle.

Fig. 7 is a section taken along the line 7—7 of Fig. 6.

In a preferred embodiment of the device, the base 1 can be formed by stamping from a suitable piece of sheet metal, although, of course, the base may be made from a casting, a die-casting, or from material shaped in other manners. Bracket 2 may be made from a flat piece of metal formed to the shape shown, the various parts being fastened by spot-welding or in any suitable manner. Base 1 may have raised portions or pads 21 formed thereon so that the front edge 22 (Fig. 2) thereof will serve as a stop for the paper to be punched, the distance from the line of punches to line of stops being that which it is desired to space the holes from the edge of the paper. The pad also will raise the bracket above the top face of the base so as to provide a slot for the papers. Bracket 2 may have apertures 23 cut therein for the purpose of facilitating assembly and for lightening the structure and hinges 24 formed integral therewith for holding handle hinge pin 25. A plurality of punches (Figs. 1 and 5) 26, 27, 27', 28, 28', 29, 29' 30, 30', 31, 31' are carried in the respective apertures 32, 33 (Figs. 2, 6, and 7) formed in bracket 2. Corresponding die apertures 34 are provided in alignment with each of the punches, said die apertures 34 communicating with tray 35.

For purposes of simplicity, only one of the punches will be described. Each punch comprises a shank having a groove cut therein for receiving split washer 36, (Figs. 2, 6, and 7), said washer having a slot so that it may be slid into said groove in the punch shank. Spring 37 is provided for normally urging the punch upwardly and into inoperative position, said spring engaging said split washer. In assembling the punch, the shank may be passed through apertures 32, 33 and through a spring 37 temporarily held aligned with the apertures and then the split washer 36 put into place. The various punches are located longitudinally of the base predetermined distances from the center line A—A (Fig. 5) of the mid-point of the punches or punch 26 in a manner and for a reason which will be described hereafter.

Handle or depressor 3 preferably is made the shape shown or a structure equivalent thereto so as to procure the necessary strength to prevent bending thereof when the punches are operated. Handle 3 has a guide bar 38 fastened thereto, said guide bar having an overhanging portion or ledge 39 spaced from the surface 40 of handle 3 and forming a guide channel therewith.

The selectors for operating selectively the various punches are shaped so that one end fits into the space between ledge 39 and cover 40, the other end of the selectors being guided by wall 41 of the handle. The selectors 15 may be of various shapes but preferably are made from rectangular stock and should be of sufficient width so that they will slide longitudinally of the handle with ease. Each of the selectors has a detent 42 placed in an aperture 43 in the end thereof, spring 44 normally urging the detent outwardly.

Depressions 45 (Figs. 1, 2, 6, and 7) are provided in the handle opposite the various punches so that as a selector is moved longitudinally of the handle, the detents will enter a selected depression and retain the selectors in position. The detents also may be shaped in conjunction with the depression so as to assist in centering a selector relative to a selected punch. The end of the detents and depressions are so shaped that the selectors may be moved to any predetermined positioner or may be spaced between two punches so that the selector becomes inoperative. The selectors as positioned in Fig. 1 are arranged to be over punches 26, 31, and 31' so that three holes can be punched which will be spaced in accordance with the predetermined distances between said three punches.

Referring to Fig. 3, the handle is shown in operative position with a selector contacting one of the punches. Further movement of the handle downwardly will cause a punch contacting a selector to be moved downwardly against the pressure of the punch spring, thereby punching a hole in a piece of paper located under the punches. It is apparent that the punches located between the selectors, such as punch 30 in Fig. 7, will not have the upper ends thereof contacted and will not be operated, the upper ends of said punches merely entering into the open space in handle 3 between selectors or into the space in the path of said selectors.

A pair of gauge bars 4 and 5 are mounted slidably in base 1, said bars preferably being stamped from a flat piece of stock. Rack or gear teeth 46 are formed therein and preferably stop short of either end of the bar. Ends 47 are bent upwardly and formed at their leading edges 48 with an outwardly flaring portion so as to assist

in guiding a piece of paper between the upstanding flanges 47. Indentations 49 may be formed in base 1 to serve as bearings for the gauge bars. The flanges 47 can be arranged (Fig. 3) so that the lower edges 60 thereof will pass over the top surface of the base 1 and thus allow the gauge to be moved to accommodate paper of relatively narrow width.

Pinion 6 (Figs. 2 and 4) is mounted between gauge bars 4 and 5 so as to engage the rack teeth of both of said bars, a pivot pin 14 being provided for supporting the pinion and a friction device or spring 8. A hexagonal or other similar shaped aperture 52 may be formed in the top of base 1, said aperture not passing entirely through the base and thus providing a shoulder for supporting pivot 14. Shank 53 passes through the reduced aperture 59 of the base and the aperture 59' of pinion 6, said pinion being rotatable on circular shank 53. A further reduced shank portion 54 depends from circular shank 53 and has a flattened portion thereon for nonrotatably holding friction spring 8. Washers 55 and 56 are used to space the various parts and the pivot may have the head 57 thereof riveted over so as to hold the parts in place. The ends of the friction spring 8 frictionally engage gauge bars 4 and 5 and serve to hold said gauge bars against the underside of the top face of base 1, thus serving to provide the necessary friction to prevent accidental displacement of the gauge bars after they are set and to take up play in the parts.

The device may be used for punching various combinations or patterns of holes in paper, there being certain standard distances and grouping of holes in various filing systems now in existence, although it is to be understood, of course, that the device may be constructed to fit any particular combination of holes and is not limited to that shown.

In Fig. 1, index numerals for the punches are indicated in heavy ink, said numerals being stamped or otherwise affixed to the base 1 and the bracket 2. In order to differentiate from reference numerals herein, the index numerals are enclosed in quotation marks.

In the form shown, the distances between the center punch and the other punches may be as follows:

	Inches
"0"–"1"	1⅜
"0"–"2"	2⅛
"0"–"3"	2¾
"0"–"4"	3½
"0"–"5"	4¼

Several methods of use of the invention will be described, the arrangement being such that practically any pattern can be made.

If a sample punched sheet of unknown width is available, the sheet can be centered by means of the gauge bars 4 and 5, said gauge bars being movable inwardly and outwardly together due to the bars being interconnected by pinion 6. The selectors can be set by observing the punches in alignment with the holes of the punched sheet. The paper to be punched then can be inserted and the handle operated which will cause contact of the selected punches with the set selectors. The top of punches not having a selector set therefor will merely pass upwardly into the space within the handle.

When the distance between the holes is known, the punches can be set without using a sample sheet. If a sheet is to have two holes located 2¾

inches apart, the two punches marked "1" (27, 27') may have a selector set opposite each one. A piece of paper then can be inserted under the punches and the gauge bars moved so as to touch the edges of the sheets which will center the same. Any other combination can be set quickly in this manner.

The selectors may be grasped by the fingers and moved until a detent snaps into place at a point when a selector is opposite the desired punch which will automatically center the same in relation to a punch. When only two holes are to be punched, the third selector may be placed between two punches so that the third selector will be inoperative. As mentioned previously, the inoperative punch shanks will pass up within the handle in the space or path wherein the selectors are slidable. Preferably an unused selector may be secured at either of depressions 45*a* or 45*b* (Fig. 1) where it is releasably secured until needed.

When the spacing is known and the punches are arranged as described herein, the punches may be set in accordance with the following table:

For 2 Holes, 2¾ inches apart, use "1" & "1"
For 2 Holes, 4¼ inches apart, use "2" & "2"
For 2 Holes, 5½ inches apart, use "3" & "3"
For 2 Holes 7 inches apart, use "4" & "4"
For 2 Holes, 8½ inches apart, use"5" & "5"
For 3 Holes, 2¾ inches apart, use "3", "0", & "3"
For 3 Holes, 3½ inches apart, use"4", "0", & "3"
For 3 Holes, 4¼ inches apart, use "5", "0", & "5"

This table may be stamped or imprinted on the base or handle of the punch or accompany the punch in some suitable manner.

If five holes are required 1⅜ inches apart, the paper can be centered by means of the gauge and the selectors moved so as to be opposite "0", "1", and "3" punches on the left side. The paper then can be punched and turned edge for edge and again punched, the center punch entering the previously punched center hole.

In the event that holes are of non-standard spacing and other than that provided, such as for example, two holes 6 inches apart, the paper is not centered, and one punch is selected such as "3" (or 29') on the left side. A sheet previously marked or punched is then held against the left gauge only and the gauge moved until the mark or hole is opposite punch "3". A piece of paper to be punched then can be inserted under the punches and the handle depressed following which the paper is turned over edge for edge and punched again. This will then provide two properly centered holes 6 inches apart. A similar procedure can be used for three, four or more holes.

Various combinations of punches, spacings of punches, and other details of construction may be used, and it is to be understood that various changes and modifications other than those specifically mentioned may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. In a desk type paper perforator, a base; a bank of a plurality of fixedly located reciprocable punches carried by said base and arranged symmetrically relative to a central punch at the mid-point of said bank; a centering guide having interconnected elements adapted to center the mid-points of sheets of different widths relative to said central punch of said bank; and a selector carrying handle, said selectors being adjustable to select punches to be operated by said handle to produce any one of a plurality of desired pattern of holes in said sheets relative to said mid-point of said blank.

2. In a desk type paper perforator, a base; a bank of a plurality of fixedly located reciprocable punches carried by said base and arranged symmetrically relative to the mid-point of said bank; a centering guide having interconnected elements adapted to center the mid-points of sheets of different widths at a predetermined location relative to said mid-point of said bank; and an operating handle pivoted on said base and having punch operating selectors slidable thereon, said selectors being positionable over various of said punches to produce desired patterns of holes relative to said mid-point in centered sheets when said handle is operated.

3. In a desk type paper perforator, a base; a bank of a plurality of fixedly located reciprocable punches including a central punch at the mid-point of said bank carried by said base and arranged symmetrically relative to the mid-point of said bank; a centering guide having elements adapted to center the mid-points of sheets of different widths relative to said central punch mid-point; an operating handle pivoted on said base and having selectors slidable thereon, said selectors being selectively positionable over said punches to produce any one of a plurality of desired odd or even number hole patterns symmetrical relative to said mid-point patterns of holes in centered sheets thereunder relative to said mid-points when said handle is operated; and detent means for yieldably holding said selectors in operative position.

4. In a desk type paper perforator, a base having a plurality of die holes arranged in a substantially straight row; a depressor member; guides for said punches fixed to said base, a plurality of reciprocable punches fixedly aligned with said die holes and supported by said guides; and a plurality of selector members readily shiftable in a path substantially parallel to said row of punches and selectively alignable with several different punches, selectors aligned with preselected punches being operable to depress said preselected punches when the depressor member is depressed, said path providing a clearance space into which all other punches can project so as to remain non-operative when the depressor is depressed whereby any one of a plurality of a preselected pattern of holes is produced.

5. In a desk type paper perforator, a base having a plurality of die holes arranged in a substantially straight row symmetrically related with a central die hole; a depressor member; a punch guide fixed to said base; a plurality of reciprocable punches fixedly aligned with said die holes and supported by said guide; and a plurality of selector members shiftable in a path substantially parallel to said row of punches and selectively alignable with several different punches, selectors aligned with preselected punches being operable to depress said preselected punches when the depressor member is depressed to provide desired patterns of holes, said path providing with and without the central punch for said central die hole clearance space into which all other punches can project so as to remain non-operative when the depressor is depressed whereby a preselected pattern of holes is produced.

6. In a desk type perforator, a base having a

plurality of die holes arranged in a substantially straight row symmetrically related with a central die hole; a handle; a punch guide fixed to said base; a plurality of reciprocable punches fixedly aligned with said die holes and supported by said guide; and a plurality of selector members housed in said handle and shiftable in a path substantially parallel to said row of punches and selectively alignable with several different punches to punch any one of several patterns of holes, selectors aligned with preselected punches being operable to depress said preselected punches when the handle member is operated to provide desired patterns of holes with odd or even numbers and optionally including said central hole, said path providing a clearance space into which all other punches can project so as to remain non-operative when the handle is operated whereby a preselected pattern of holes is produced.

7. In a desk type perforator, a base, a handle, a bank of a multiplicity of punches including a centrally located punch, a plurality of selector members shiftable to preselected positions in alignment with preselected punches which are to be operated to punch selected patterns with and without said central punch, and latching means at each of said preselected positions cooperating with latching means on said selector members to position and releasably hold said selectors at said preselected positions.

8. In a desk type perforator, a base, a handle, a bank of a multiplicity of punches equidistantly located on each side of the central punch, a plurality of selector members shiftable to preselected positions in alignment with preselected punches which are to be operated to produce patterns with even numbers of holes without said central punch and odd numbers of holes with said central punch, and latching means at each of said preselected positions cooperating with a friction type locking means on said selector members to position and releasably hold said selectors at said predetermined positions.

9. In a desk type perforator, a base, a handle, a bank of a multiplicity of punches, a plurality of selector members shiftable along said handle to preselected positions in alignment with preselected punches which are to be operated, latching means at each of said preselected positions, and a spring urged friction type lock cooperating with said latching means to position and releasably hold said selectors at said preselected positions.

10. In a desk type perforator, a base, a handle, a bank of a multiplicity of punches, a plurality of selector members shiftable along said handle to preselected positions in alignment with preselected punches which are to be operated, latching means including indentations aligned with each punch, and a spring urged latch on each selector adapted to engage in said indentations to position and releasably hold said selectors at said preselected positions.

11. In a desk type paper perforator, a plurality of punches; selectors positionable to selectively operate said punches; a handle slidably carrying said selectors, said handle having walls defining a groove for guiding one end of said selectors and a wall for guiding the other end of said selectors; and detent means for releasably holding said selectors at selected points.

12. In a desk type paper perforator, a plurality of punches; selector bars positionable to selectively operate punches; a handle slidably carrying said selectors, said handle having walls defining a groove for guiding one end of said selector bars; a wall for guiding the other end of said selector bars; and spring pressed detents carried by said selectors cooperable with depressions in one of said walls for releasably holding said selectors in selected punch operating positions.

13. In a desk type paper perforator, a plurality of punches; an operating handle having a track for carrying selectors; and punch operating selectors slidable in said track, said selectors being constructed and arranged so that when over a punch, operation of the handle will operate the punch and punch shanks not to be operated will pass into a clearance space provided by said track within said handle.

14. In a desk type paper perforator, a base; a bank of a plurality of selectively operable punches and a central punch mounted on said base and said punches being equidistantly spaced from said central punch; a pair of co-operating gauge members oppositely movable inwardly and outwardly relative to said base so as to center the mid-points of sheets at the mid-point of said central punch; and an operating handle slidably carrying a plurality of selectors, said selectors being settable on said handle to operate punches to produce desired patterns of holes in said sheet as said handle is operated, said patterns being equistantly spaced from said mid-point.

15. In a desk type paper perforator, a base; a bank of a plurality of selectively operable punches symmetrically fixedly located on said base relative to a mid-point of said punches; a central punch at said mid-point; a pair of gauge members having rack teeth thereon, said gauge members being slidably mounted on said base; a pinion mounted between said gauge bars and engaging both racks so that the gauge bars will be moved oppositely relative to each other to accommodate and center the mid-point of paper of varying widths relative to the mid-point of said punches; and means to select the central punch to be operated to produce a desired pattern of holes optionally including said central punch.

16. In a desk type paper perforator, a base; a plurality of selectively operable punches equidistantly located relative to a mid-point and having a central punch at said mid-point; a handle having a track therein; selector bars slidably mounted in said track; detent means adapted to yieldably hold said selector bars in selected punch operating positions so as to produce any one of a desired pattern of holes of even numbers of holes without said central punch and with odd numbers of holes with said central punch; a pair of gauge members having rack teeth thereon, said gauge members being slidably mounted on said base; a pinion mounted between said gauge bars and engaging both racks so that the gauge bars will be moved oppositely relative to each other to accommodate and center paper of varying widths relative to said punches.

17. In a desk type perforator, a base; a bank of a plurality of selectively operable punches symmetrically located relative to a central punch; a handle; selectors positionable to selectively operate predetermined patterns of said punches when said handle is operated; a guide bar and pinion system including a pair of cooperating guide members having rack teeth thereon, said guide members being mounted on said base and oppositely movable relative to each other and

said base; a pinion rotatably mounted on said base interconnecting said rack teeth; and means engaging said guide and pinion system preventing rotation of said pinion except when said guide bars are being adjusted, said guide members centering the mid-point of sheets to be punched substantially in registry with said central punch.

18. In a desk type perforator having a bank of a plurality of fixedly located selectively operable punches mounted on a base, said punches being located in pairs equidistantly positioned on either side of a central punch on said base, a depressor member having a plurality of slidable means thereon operable to selectively operate punches when said depressor member is actuated, and a pair of interconnected sheet centering guides movable on said base automatically centering sheets relative to said central punches, each of said guides having a paper engaging portion, each of said paper engaging portions being movable between positions between the ends of the other guide and positions beyond the end of said other guide, so that any one of a plurality of independent patterns of holes with and without a central hole can be punched, said holes being equidistantly spaced from the central punch.

19. In a desk type perforator, a base, a bank of a plurality of selectively operable punches symmetrically located relative to a central punch, said punches being fixedly mounted on said base, a punch depressor member mounted on said base and having punch activating means thereon selectively movable to activate punches equidistantly spaced on either side of said central punch and with and without said central punch, and a pair of cooperating interconnected sheet centering guides movable on said base to automatically center sheets relative to said central punch, each of said guides having a paper engaging portion movable beyond the sides of said base, each of said paper engaging portions being movable between positions between the ends of the other guide and positions beyond the end of said other guide.

20. In a desk type perforator, a base, a bank of a plurality of selectively operable punches symmetrically located relative to a central punch, said punches being fixedly mounted on said base, a punch depressor member mounted on said base and having punch activating means thereon selectively movable to activate punches equidistantly spaced on either side of said central punch and with and without said central punch, and a pair of cooperating interconnected sheet centering guides movable on said base to automatically center sheets relative to said central punch, each of said guides having teeth therein with an interconnecting pinion, each of said guides having a paper engaging portion movable beyond the sides of said base, each of said paper engaging portions being movable between positions between the ends of the other guide and positions beyond the end of said other guide.

21. In a desk type perforator, a base, fixedly located reciprocable punches mounted on said base including a central punch, a pivoted lever mounted on said base for operating said punches, and a pair of cooperating interconnected sheet centering guides movable on said base to automatically center sheets relative to said central punch, said guides having gear teeth engaging an interconnecting pinion, each of said guides having a paper engaging portion movable beyond the sides of said base, each of said paper engaging portions being movable between positions between the ends of the other guide and positions beyond the end of said other guide.

JOHN A. YERKES.

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Certificate of Correction

Patent No. 2,534,094 December 12, 1950

JOHN A. YERKES

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 5, line 32, for the numeral "3", second occurrence, read *4*; column 6, line 5, for the word "blank" read *bank*; column 8, line 44, for "punches" read *central punch*; line 45, for "central punch" read *punches*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of May, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.